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(54) Tissue retention spool for intraluminal anastomotic surgical stapling instrument and methods.

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Description

This invention relates to intraluminal anastomotic surgical stapling instruments and more particularly to improved apparatus and methods for securing and stapling together remaining portions of transected tubular tissues and organs.

In recent years, there has been a steady increase in the use of intraluminal staplers in surgical procedures involving the alimentary canal, from the esophagus to the anus.

Intraluminal circular staplers, disclosed in U.S. Patent No. 4,319,576 produce a result generally superior to hand-placed sutures. These apparatus considerably reduce the time required to perform the procedure as compared to the hand-placing of sutures.

In the use of intraluminal circular staplers, it is current practice to secure tubular tissue, such as a bowel, to the stapler before the bowel is stapled together. This is accomplished by placing a purse-string suture in the bowel end and drawing up the end of the bowel around the stapler rod by tightening the purse-string suture.

Purse-string sutures are placed in the bowel end by hand, or by the use of a purse-stringer apparatus of the type disclosed in U.S. Patent No. 4,345,600. While this type apparatus is of great assistance in placing purse-string sutures, tissue which is too thick or too thin may cause a malfunction such as a missed stitch or a stitch too shallow to hold. If these conditions are not corrected prior to setting the staples and excising the excess internal tissue from the organ, a leaky and non-hemostatic anastomotic can result.

Moreover, the purse-stringer apparatus is very difficult to use in certain procedures where organ access is difficult, such as in certain low colon resections. In such cases, it is not possible to use a purse-stringer, and it is extremely difficult and time consuming to place the purse-string suture by hand. Also, and for these above reasons, it is difficult to make use of a "closed technique" in this limited access situation.

Still further, in such difficult access procedures as a low colon resection, it is frequently necessary to utilize rectal stump retention sutures to hold the rectal stump up and erect for further suturing. These retention sutures can slip or tear out, and are otherwise bothersome as being in the way.

In accordance with one aspect of the invention, an intraluminal anastomotic surgical stapling instrument has a staple cartridge, a cylindrical scalpel within the cartridge, and a staple anvil mounted on a rod extending from the staple cartridge, the anvil being shiftable toward the staple cartridge for bringing ends of the transected tubular tissue structure together for stapling, characterised in that a tissue retention means is mounted on the rod accessible between the staple cartridge and the anvil for holding an end of a tubular tissue structure prior to and during an anastomotic procedure, and in that the tissue retention means is frictionally mounted on the rod and is yieldably slidable therealong.

Preferably, the tissue retention means is a flanged spool yieldably disposed on the instrument rod between the anvil and the cartridge. The spool flanges are of lesser diameter than the cylindrical scalpel provided in the instrument.

In use the instrument is inserted into tubular tissue, such as a bowel, and the bowel is drawn radially inwardly by means of wrapping, tying and tightening a suture, or some other means such as a plastic tie, around the bowel at the spool. The tissue is secured to the spool by the suture or tie, with the spool flanges facilitating tissue retention. Thereafter, the bowel is cut adjacent the spool's forward flange, with the lower bowel being retained about the spool by the wrapped suture.

The upper bowel is then transected and the remaining bowel end portion is brought into position over the distal end of the instrument. Since this end is usually freely accessible, a purse-string suture is mechanically applied and the end is secured over the anvil and about the rod adjacent the spool.

Thereafter, the anvil is drawn toward the staple driving cartridge while the spool and secured bowel end move along the rod and into the area surrounded by the cartridge and the cylindrical scalpel. Once the anvil is properly placed relative to the staple cartridge, the instrument is activated to implant the staples and move the scalpel forward around the spool, cutting off tissue within the lumen of the bowel interiorly of the circular staple line. This leaves tissue "doughnuts" surrounding the spool and the rod, and this tissue is removed with the instrument as it is withdrawn.

In an alternative embodiment, two spools of appropriate width could be mounted on the instrument rod, one spool for securing the end of the proximal organ and one for securing the end of the distal organ.

In yet another embodiment, a washer or flange is provided as a part of the staple anvil for attachment of the end of the distal organ internally of the stapled anvil.

The stapling instrument provides a number of improvements and advantages. It eliminates the purse-stringing requirements for at least the proximal organ end, and secures that end for stapling in a more consistently uniform manner. This greatly facilitates use of the stapling instrument in limited access area, while at the same time improving the closure result and permitting the use of a "closed technique" even when dealing with a lower colon resection. Also in this connection, the stapling instrument serves to eliminate the need for using retention sutures for the rectal stump and renders the instrument itself usable to hold the stump in place.

Accordingly, use of an intraluminal anastomotic surgical stapling instrument is enhanced, surgical procedures are improved, and a great deal of time and tedious procedure techniques are saved and eliminated, while the uniformity of final tissue anastomotic is improved.

French document No. 2490482 shows an anas-

tomotic surgical instrument having a tissue retention spool with flanged ends and a tissue retaining surface. This is held in position on a rod extending between a staple cartridge and an anvil by a circular collar whose position is fixed for the duration of the operation.

In accordance with another aspect of the invention, a tissue retention spool for an intraluminal anastomotic surgical stapling instrument has at least one flanged end extending radially outwardly of the spool and a cylindrical tissue retention surface including a plurality of radial tissue engaging projection means for holding the tissue against sliding therefrom, characterized in that the spool has an internal bore having yieldably frictional gripping means.

The invention will now be further described by way of example with reference to the accompanying drawings in which:

Figure 1 is a perspective view of the ILS instrument in accordance with this invention,

Figure 2 is a cross-sectional view of a tissue retention spool in accordance with the invention,

Figure 3 is a more detailed cross-sectional view of the staple cartridge, anvil and tissue retention spool of the instrument shown in Figure 1,

Figure 4 is a cross sectional view of the instrument of Figure 1 as taken along lines 4—4 of Figure 3,

Figure 5 is a perspective view illustrating the initial step of utilization of the instrument shown in Figure 1,

Figure 5a is a perspective view similar to Figure 5, but showing an alternative plastic tie securing tissue about the spool,

Figure 6 is a view illustrating the initial excision in tubular tissue with which the instrument shown in Figure 1 is used,

Figure 7 is a partial cross-sectional view showing the instrument of Figure 1 in extended form prior to the stapling of a transected bowel,

Figure 8 is a partial cross-sectional view of the instrument of Figure 1 showing the position of the staple cartridge, the anvil and the tissue retention spool immediately prior to stapling of the transected bowel together and the cutting of the internal ends of the transected bowel internally of the circular staple line,

Figure 9 is a cross-sectional view showing removal of the instrument shown in Figure 1 from the anastomotic of a transected bowel,

Figure 10 is a cross sectional view illustrating the utilization of the instrument shown in Figure 1 in a limited access area, and

Figures 11a and 11b are respective end and longitudinal views of a tubular structure and a purse-string suture associated therewith.

Turning now to the drawings, there is shown in Figure 1 an intraluminal anastomotic surgical stapling instrument 10. For purposes of brevity in the following description, the intraluminal anastomotic surgical stapling instrument 10 is referred to as an "ILS" instrument 10. Certain details of the ILS instrument 10 shown in Figure 1 are illustrated and described in U.S. Pat. No. 4,319,576, which for purposes of disclosure is incorporated herein by reference.

This ILS instrument 10 is particularly useful for the anastomotic of transected tubular tissue structures such as body organs, and including but not limited to, the esophagus, stomach and bowel, and is generally used as described in U.S. Patent No. 4,319,576 for stapling transected organs together. Such provides an improved method for the anastomotic or joining by stapling of transected tubular tissues.

The ILS instrument 10 includes a handle or proximate end portion 11 and a distal or operative end portion 12, separated by an elongated shank 13. Shank 13 serves to mount the operative end 12 away from the handle 11, and provides a housing for control members which extend between the operative end 12 and the proximate end 11.

As perhaps best seen in the cross section of Figure 3, the operative end 12 includes an anvil 14 and a cylindrical staple carrier or cartridge 15 housing the staple driving apparatus 15a. Staple driving apparatus 15a is provided with one or preferably two circular, staggered arrays 16 and 17 of staples as best shown in the cross section of Figure 4. The arrays 16 and 17 illustrate the disposition of two circular, staggered lines of staples utilized to secure the transected tissue together. Drivers 15a behind the staples can be shifted to drive the staples forwardly through tissue and onto anvil 14 for clinching, as disclosed in U.S. Patent No. 4,319,576.

A cylindrical scalpel or knife 18 is disposed within the staple cartridge 15 and is shiftable outwardly, upon actuation of the handle 19 at the handle end 11, to engage a washer 20 interiorly of the anvil 14 and excise any tissue therebetween. As noted from the drawings, the staple driving cartridge 15, together with arrays 16 and 17 and the anvil 14, are generally circular, the anvil providing means for clinching the individual staples as they are driven outwardly of the staple driving cartridge 15, also upon actuation of the handle 19 at handle end 11 of the ILS instrument 10.

Turning briefly to the description of the operation of the ILS instrument as disclosed in U.S. Patent No. 4,319,576, the anvil 14 is shifted away from the staple cartridge 15 by rotation of a knob 21 at the handle end 11. This can be done before or after the instrument is inserted into a lumen, for example.

Thereafter, and prior to the ILS instrument 10, a purse-string suture (see Figs. 11A and 11B) was applied to the proximate end of the lumen either by means of a purse-stringer such as that shown in U.S. Pat. No. 4,345,600, or manually. The lower end of the lumen was then secured to the rod 22 about the staple cartridge head 15 by drawing up the purse-string suture. Thereafter, the upper end of the lumen was pulled off over the anvil 14 and the diseased portion removed. The lower end of the upper transected lumen was then provided also with a purse-string suture. It was then pulled

over the anvil 14 and thereafter gathered around the rod 22 just in front of the anvil 14. Thereafter, the knob 21 was rotated so as to shift the anvil 14 toward the staple cartridge 15. This positioned the anvil 14 in operative relationship with the cartridge 15 to clinch the staples to be driven. Handle 19 was then operated, whereupon the staples were driven into inwardly turned flanges of both the lower and upper lumen, and in the circular arrayed pattern of staggered staple rows. At the same time, the cylindrical knife 18 was driven forward to excise the tissue internally of the staple rows. Once the staples were driven and the tissue excise, the ILS instrument was freed and was withdrawn through the lumen, leaving a rejoined lumen by means of the circular arrays of staples.

When the purse-string suture was applied by hand, or mechanically through use of a purse-stringer as disclosed in U.S. Pat No. 4,345,600, there was some possibility that a stitch may be missed, or may be placed too shallow to hold, or otherwise would not be secured to the tissue in a uniform manner, such as that shown in Figs. 11A and 11B. If a stitch was missed or if the stitch was placed too shallow to hold, a portion of the tissue is released and the final stapled anastomotic may not be uniform or secure, but rather could leak. Moreover, there are many occasions where it is necessary to transect a bowel, for example, in a place where access is difficult to obtain. This occurs, for example, in the lower colon and rectal area such as illustrated in Fig. 10, where the lower portion of the bowel to be transected is surrounded by bone and other tissues; making it very difficult for the surgeon to manually place a proper purse-string suture, as shown in Figs. 11A and 11B, and almost impossible to utilize a purse-stringer as shown in U.S. Pat. No. 4,345,600.

The ILS instrument 10 shown in Figure 1 on the other hand has tissue retention means located on the rod 22, as shown in Fig. 1, in a position between the anvil 14 and staple cartridge 15. Such a tissue retention means preferably comprises a tissue retention spool 30 which is shown in a number of the drawings.

The tissue retention spool 30 is comprised of two flanges, including a distal flange 31 and a proximate flange 32, separated by a shank member 33. The flanges 31, 32 are of greater diameter than the shank 33, as shown in Fig. 1. In addition, the shank 33 is provided with a plurality of radially extending tissue engaging projections or ridges 34 which enhance the securing of tissue to the spool 30, as is hereinafter described.

These ridges, or projections 34, serve to restrain the tissue against lateral or normal movement with respect to the spool. While various projection heights and widths can be chosen with a view toward the specific tissue in mind, one suitable spool 30 contains a plurality of projections which are approximately .040 inches (1.0 mm) high and which measure about .070 inches (1.8 mm) from crest to crest. It is believed that a preferred range of projection height is approximately .030 inches (0.8 mm) or greater, depending on the type of tissue used. However, different projection heights may be found to be suitable.

It is also noted that the spool 30 has a preferable outside diameter of approximately .55 inches (14 mm) and that the spool width from flange to flange is approximately .35 inches (9 mm). Of course, there are different size ILS instrument instruments, depending upon the particular application desired, and spool sizes are adjusted accordingly. For example, and without limitation, certain ILS instrument instruments may be found in the ranges of 21, 25, 29 and 33 millimeters, which is the outside diameter of the staple cartridge 15 at the distal end of the ILS instrument 10.

The spool 30 is mounted on the rod 22 in frictional engagement therewith so that the spool 30 tends to remain in a set position on the rod 22, but also so that the spool 30 can be moved along the rod 22 only after the application of a predetermined axial force to the spool 30, or the rod 22 when the spool 30 is held. In this regard, the spool 30 is preferably made from a resilient material. One such material found to be suitable is based on the composition of beryllium sulfide and sold by the Shell Oil Company under the name, "KRAYTON". Other materials may be useful as well. Such materials, when used to form the spool and in conjunction with the metallic rod 22, has been found to provide a sufficient resistance to sliding of the spool along the rod.

It will also be appreciated that the outer diameter of the spool 30, flanges 31 and 32 is at least slightly less than the inside diameter of the cylindrical scalpel 18, so that the spool 30 can be shifted or received within the area surrounded by the cylindrical scalpel 18.

In an alternative embodiment, a modified spool is utilized, as shown in Fig. 2. The alternative spool includes a plurality of inwardly extending projections 40, having tapered ends 41 and 42. The projections 40 are formed to frictionally engage the rod 22 to provide the desired resistance to sliding of the spool 30 along the rod 22. In Fig. 2, the spool 30 is otherwise similar to that of the preferred embodiment, as indicated by the primed numbers utilized to indicate like parts.

Turning now to Figs. 5—9, the ILS instrument 10 shown in Fig. 1 is operated as follows.

First, the ILS instrument 10 is inserted into a tubular tissue structure such as a bowel as shown in Fig. 5. In Fig. 5, a lower bowel 50 and an upper bowel 51 are referred to for illustrative purposes. Prior to or after insertion of the ILS instrument 10 into the bowel 50, the knob 21 of the ILS instrument is operated to extend the anvil 14 away from the staple cartridge 15, thus exposing the spool 30 between the anvil 14 and the stapler cartridge 15.

Once the ILS instrument 10 is inserted to a position below the area to be transected, the surgeon feels for the spool 30 to insure its presence in the open area between the anvil 14 and cartridge 15. He thereafter gathers in and secures the tissue of the bowel around the spool 30 between the flanges 31, 32 and against the

projections 34. This can be done by means of a suture 52, which is wrapped around the tissue in the area between the spool flanges 31, 32 and is tightened and tied so as to securely hold the tissue against the spool. No purse-string suture is required, the wrapped suture 52 holding the tissue on the projections 34 of the spool 30. Alternatively, and as shown in Fig. 6A, a clinchable plastic tie 53 could be used in place of the suture. Any other suitable securing means, such as suture 52 or plastic tie 53, could also be used.

Thereafter, and once the suture has been tied, for example, the upper bowel 51 can be excised from the lower bowel 50, as shown in Fig. 6. The distal spool flange 31 can be used as a cutting guide. It will be appreciated that the suture 52 or plastic tie 53, after this incision is made, retains the upper end of the lower bowel 50 positively on the spool 30. Thereafter, the upper bowel 51 can be removed from the anvil 14 end of the ILS instrument 10 and the upper bowel 51 can be transected to remove a diseased portion, for example. Once the diseased portion has been removed, the transected upper bowel 51, having a lower end 54, is provided with a purse-string suture 55. The end 54 is gathered about the rod 22 of the ILS instrument and over anvil 14. The upper end 56 of the lower bowel 50 remains secured to the spool 30.

At this point, the handle 19 of the ILS instrument is operated to shift the anvil 14 toward the staple cartridge 15 and to a predetermined distance between the anvil 14 and the leading edge of the staple cartridge 15. This is determined by a preliminary measurement of the thickness of the tissue to be joined and may be, for example, on the order of 1 to 3 millimeters, but may be more or less depending on the nature of the tissues to be joined.

As the anvil 14 is shifted by means of retraction of rod 22 into cartridge 15 and shank 13, when the knob 21 is operated, the anvil 14 pulls the end 54 of the upper bowel 51 in a direction toward the distal flange 31 of the spool 30. The spool 30 is also moved, however, by the rod into the area surrounded by the internal diameter of the cylindrical scalpel 18, all as shown in Fig. 8. Once the spool 30 is so positioned, as in Fig. 8, further inward movement of the rod 22 and anvil 14 is possible since the spool 30 can now slide on rod 22 by virtue of its yieldable friction fit. Movement of the spool 30 into the scalpel 18 area tends to stretch the end 56 of the lower bowel 50 around the forward end of the staple cartridge 15.

Once the anvil 14 has been moved into the predetermined relationship with the staple cartridge 15, the handle 19 is operated to drive staples through the two layers of tissue between the staple cartridge 15 and the anvil 14. At the same time, the cylindrical scalpel 18 is driven forwardly to excise the bowel tissue internally from rod 22. This leaves a ring or doughnut of bowel tissue ends on rod 22 and spool 30.

Accordingly, a circular array of staples, such as illustrated in Fig. 9 (with only two of the staples 57 being shown), uniformly joins the lower bowel 50 to the upper bowel 51. The ILS instrument 10 is then withdrawn through the lower bowel 50, carrying with it the excised lower end 54 of the upper bowel 51 and the excised upper end 56 of the bowel 50, as illustrated in Fig. 9.

The importance of the frictional engagement of the spool 30 on the rod 22 is readily appreciated from the foregoing description. First, the spool 30 must remain in one position on the rod 22 so as to be disposed between the anvil 14 and cartridge 15 when the instrument 10 is opened within a lumen or when the opened instrument 10 is inserted. Secondly, it is desirable that the spool 30 remain in position on the rod 22 as the surgeon feels for it and ties the tissue around it. Thirdly, it should remain on the rod 22, resisting sliding, while it draws the tissue into the cartridge 15 and the area surrounded by scalpel 18, but must then slide, without unduly stretching tissue, as the anvil 14 and rod 22 are shifted further inwardly. Such a frictional, yieldable fit is obtained by the structure as described above wherein the frictional engagement resists initial force differentials between spool 30 and rod 22.

In particular, it will be immediately appreciated that the ILS instrument 10, including the tissue retention means, such as spool 30, provides a way to enhance the anastomotic of tubular tissue structures, particularly in limited access areas such as that shown in Fig. 10 which illustrates a lower rectal resection procedure. In such procedure, the ILS instrument 10 is inserted into the rectum and the process steps mentioned above are conducted, it being unnecessary to utilize a purse-string suture in the upper end of the lower rectal stump RS. Thereafter, the upper transected bowel UB can be surgically treated. A purse string can easily be placed in the remaining portion of the bowel, where access to it is usually free, and is thereafter set over the anvil 14, as illustrated in Fig. 10, prior to drawing the anvil 14 toward the staple cartridge 15 and stapling to rejoin the bowel.

This technique includes numerous advantages. As mentioned above, it eliminates the requirement for purse-stringing of the lower rectal stump RS and as well permits the surgeon to carry out a "closed" technique, where the lower rectal stump can be closed around the ILS instrument 10 and is not open within the body during the surgical procedure. Also, the ILS instrument 10 itself is utilized to hold the rectal stump RS in an erect position for further connection to the transected bowel UB and no retention sutures are required.

Accordingly, it is unnecessary for the surgeon to spend tedious time in trying to manually produce a purse-string suture in the lower rectal stump and the procedure can be utilized when the lower rectal stump is so low that it is impossible to utilize a purse-stringing device, such as that mentioned above.

In addition to the alternative embodiments mentioned above, a number of modifications and alterations will become readily apparent. For

example, it would also be possible to attach the purse-string sutured upper bowel to the same spool, rather around the rod adjacent the spool. If the spool were wide enough, it would also be possible to eliminate the purse-string suture in the upper bowel and to attach the bowel to the spool 30 in the same manner as the lower bowel. Also, it would be possible in an appropriately sized instrument, to utilize two tissue retaining means or spools, one for the lower tubular structure and one for the upper tubular structure, with no purse-string suture being required.

Of course, it will also be appreciated that the elimination of the requirement for any portion of a purse-string suture procedure will save a substantial amount of time and that the ILS instrument 10, when used in areas to which accessibility is not particularly limited, is also highly advantageous.

Claims

1. An intraluminal anastomotic surgical stapling instrument having a staple cartridge, a cylindrical scalpel within the cartridge, and a staple anvil mounted on a rod extending from the staple cartridge, the anvil being shiftable toward the staple cartridge for bringing ends of the transected tubular tissue structure together for stapling, characterised in that a tissue retention means (30) is mounted on the rod (22) accessible between the staple cartridge (15) and the anvil (14) for holding an end of a tubular tissue structure prior to and during an anastomotic procedure, and in that the tissue retention means (30) is frictionally mounted on the rod (22) and is yieldably slidable therealong.

2. An instrument as claimed in claim 1 wherein the tissue retention means (30) is movable between a first position disposed between the anvil (14) and the staple cartridge (15) for attachment of a closed tubular tissue structure thereto and a second position within the staple cartridge (15).

3. An instrument as claimed in either claim 1 or 2 wherein the tissue retention means (30) is frictionally mounted on the rod (22) against axial movement therealong and is yieldable for movement along the the rod (22) and within the cylindrical scalpel (18) when the anvil (14) is shifted towards the staple cartridge (15).

4. An instrument as claimed in any preceding claim wherein the tissue retention means comprises a flanged spool (30).

5. An instrument as claimed in claim 4 wherein the spool (30) has a flange (31, 32) at each end and includes radially extending tissue engaging projections (34) disposed between the flanges.

6. An instrument as claimed in either claim 4 or 5 wherein the spool (30) has an internal bore receiving the rod (22), and wherein elongated, axially extending, radially inwardly projecting projections (40) frictionally engage the rod within the bore.

7. An instrument as claimed in claim 6 wherein the ends (41, 42) of the axially extending projections (40) are tapered away from the rod.

8. An instrument as claimed in either claim 4 or 5 wherein the spool (30) has an internal bore defined by a resilient surface for frictional, yieldable engagement with the rod.

9. An instrument as claimed in any one of claims 4 to 8 wherein the outer diameter of the spool (30) is less than the inside diameter of the cylindrical scalpel (18).

10. A tissue retention spool for an intraluminal anastomotic surgical stapling instrument having at least one flanged end extending radially outwardly of the spool and a cylindrical tissue retention surface including a plurality of radial tissue engaging projection means for holding the tissue against sliding therefrom, characterized in that the spool (30) has an internal bore having yieldable frictional gripping means (40).

11. A tissue retention spool as claimed in claim 10 wherein the yieldable frictional gripping means comprises a plurality of axially extending inwardly projecting lugs (40).

12. A tissue retention spool as claimed in claim 11 wherein ends (41, 42) of the lugs (40) are tapered.

13. A tissue retention spool as claimed in any one of claims 10 to 12 wherein the spool (30) is formed from a resilient material.

Patentansprüche

1. Intraluminales anastomotisches chirurgisches Heftinstrument mit einem Fadeneinsatz, einem zylindrischen Skalpell innerhalb des Einsatzes und einem auf einem aus dem Fadeneinsatz ragenden Stab befestigen Heftamboß, wobei der Heftamboß gegen den Faseneinsatz bewegt werden kann, um die Enden der durchtrennten röhrenförmigen Gewebestruktur zur Aneinanderheftung zusammenzuführen, dadurch gekennzeichnet, daß eine Geweberückhaltevorrichtung (30) zwischen dem Fadeneinsatz (15) und dem Amboß (14) zum Halten eines Endes der röhrenförmigen Gewebestruktur vor und während eines anastomotischen Vorganges am Stab (22) zugänglich befestigt ist und daß die Geweberückhaltevorrichtung (30) am Stab (22) reibschlüssig befestigt ist und daran nachgiebig entlangrutschen kann.

2. Instrument nach Anspruch 1, dadurch gekennzeichnet, daß die Geweberückhaltevorrichtung (30) zwischen einer ersten zwischen dem Amboß (14) und dem Fadeneinsatz (15) angeordneten Stellung zur dortigen Befestigung einer geschlossenen röhrenförmigen Gewebestruktur und einer zweiten Stellung innerhalb des Fadeneinsatzes (15) beweglich ist.

3. Instrument nach einem der Ansprüche 1 oder 2, dadurch gekennzeichnet, daß die Geweberückhaltevorrichtung (30) am Stab (22) gegen axiale Bewegung dort entlang reibschlüssig befestigt und einer Bewegung längs des Stabes (22) und innerhalb des zylindrischen Skalpells (18) nachgibt, wenn der Amboß (14) gegen den Fadeneinsatz (15) verschoben wird.

4. Instrument nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Gewoberückhaltevorrichtung eine angeflanschte Spule (30) enthält.

5. Instrument nach Anspruch 4, dadurch gekennzeichnet, daß die Spule (30) an jedem Ende einen Aufsatz (31, 32) aufweist und zwischen den Aufsätzen angebrachte sich radial erstreckende Gewöbeeingriffsvorsprünge (34) enthält.

6. Instrument nach einem der Ansprüche 4 oder 5, dadurch gekennzeichnet, daß die Spule (30) eine Innenbohrung zur Aufnahme des Stabes (22) und daß verlängerte, sich axial erstreckende, radial nach innen ragende Vorsprünge (40) den Stab innerhalb der Bohrung reibschlüssig umfassen.

7. Instrument nach Anspruch 6, dadurch gekennzeichnet, daß die Enden (41, 42) der sich axial erstreckenden Vorsprünge (40) vom Stab weg verjüngt sind.

8. Instrument nach einem der Ansprüche 4 oder 5, dadurch gekennzeichnet, daß die Spule (30) eine Innenbohrung aufweist, welche durch eine federnde Oberfläche zum reibschlüssigen, nachgiebigen Eingriff mit dem Stab bestimmt ist.

9. Instrument nach einem der Ansprüche 4 bis 8, dadurch gekennzeichnet, daß der Außendurchmesser der Spule (30) kleiner als der Innendurchmesser des zylindrischen Skalpells (18) ist.

10. Geweberückhaltespule für ein intraluminales anastomotisches chirurgisches Heftinstrument mit wenigstens einem angeflanschten Ende, welches sich radial außerhalb der Spule erstreckt, und einer zylinderförmigen, eine Vielzahl von radialen Gewebeeingriffsvorsprüngen enthaltende Geweberückhalteoberfläche, sodaß das Gewebe davon nicht abgleitet, dadurch gekennzeichnet, daß die Spule (30) eine Innenbohrung mit nachgiebigen reibenden Greifvorrichtungen (40) aufweist.

11. Geweberückhaltespule nach Anspruch 10, dadurch gekennzeichnet, daß die nachgiebige reibende Greifvorrichtung aus einer Vielzahl von sich axial erstreckenden nach innen ragende Osen (40) besteht.

12. Geweberückhaltespule nach Anspruch 11, dadurch gekennzeichnet, daß die Enden (41, 42) der Ösen (40) verjüngt sind.

13. Geweberückhaltespule nach einem der Ansprüche 10 bis 12, dadurch gekennzeichnet, daß die Spule (30) aus einem federnden Material gebildet ist.

Revendications

1. Une agrafeuse chirurgicale intraluminale anastomosante comportant une cartouche à agrafes, un scalpel cylindrique à l'intérieur de la cartouche, et une enclume à agrafes montée sur une tige faisant saillie de la cartouche à agrafes, l'enclume pouvant être déplacée vers la cartouche à agrafes pour rapprocher l'une de l'autre les extrémités de la structure tissulaire tubulaire tranchée transversalement en vue de l'agrafage, caractérisée en ce qu'un moyen de rétention des tissus (30) est monté sur la tige (22) de manière accessible entre la cartouche à agrafes (15) et l'enclume (14) pour maintenir en place une extrémité d'une structure tissulaire tubulaire avant et pendant une procédure anastomosante, et en ce que le moyen de rétention des tissus (30) est monté en friction sur la tige (22) et peut coulisser de manière relâchable le long de celle-ci.

2. Un instrument selon la revendication 1 dans lequel le moyen de rétention des tissus (30) est mobile entre une première position située entre l'enclume (14) et la cartouche à agrafes (15) pour y fixer une structure tissulaire tubulaire fermée, et une seconde position à l'intérieur de la cartouche à agrafes (15).

3. Un instrument selon l'une ou l'autre des revendications 1 ou 2 dans lequel le moyen de rétention des tissus (30) est monté en friction sur la tige (22) opposé au mouvement axial le long de celle-ci, et est relâchable en vue de mouvement le long de la tige (22) et à l'intérieur du scalpel cylindrique (18), quand l'enclume (14) est dépalcée vers la cartouche à agrafes (15).

4. Un instrument selon l'une quelconque des revendications précédentes dans lequel le moyen de rétention des tissus comprend une bobine à joues (30).

5. Un instrument selon la revendication 4 dans lequel la bobine (30) a une joue (31, 32) à chaque extrémité et comporte des projections s'engageant dans les tissus s'étendant radialement (34) disposées entre les jours.

6. Un instrument selon l'une ou l'autre des revendications 4 ou 5 dans lequel la bobine (30) a un alésage interne recevant la tige (22), et dans lequel des projections allongées, s'étendant axialement, et faisant saillie radialement vers l'intérieur (40) s'engagent en friction avec la tige à l'intérieur de l'alésage.

7. Un instrument selon la revendication 6 dans lequel les extrémités (41, 42) des projections s'étendant axialement (40) se terminent en biseau en s'éloignant de la tige.

8. Un instrument selon l'une ou l'autre des revendications 4 ou 5 dans lequel la bobine (30) a un alésage interne défini par une surface élastique pour un engagement en friction relâchable avec la tige.

9. Un instrument selon l'une quelconque des revendications 4 à 8 dans lequel le diamètre externe de la bobine (30) est inférieur au diamètre interne du scalpel cylindrique (18).

10. Une bobine de rétention des tissus pour une agrafeuse chirurgicale anastomosante intraluminale comportant au moins une extrémité à joues s'étendant radialement vers l'extérieur de la bobine et une surface cylindrique de rétention des tissus comportant une pluralité de moyens de projections radiaux s'engageant avec les tissus pour empêcher les tissus de glisser de celle-ci, caractérisée en ce que la bobine (30) a un alésage interne ayant des moyens d'accrochage en friction relâchables (40).

11. Une bobine de rétention des tissus selon la

revendication 10 dans laquelle les moyens d'accrochage en friction relâchables comprennent une pluralité de pattes s'étendant axialement faisant saillie à l'intérieur (40).

12. Une bobine de rétention des tissus selon la revendication 11 dans laquelle les extrémités (41, 42) des pattes (40) sont en biseau.

13. Une bobine de rétention des tissus selon l'une quelconque des revendications 10 à 12 dans laquelle la bobine (30) est fabriquée à partir d'un matériau élastique.

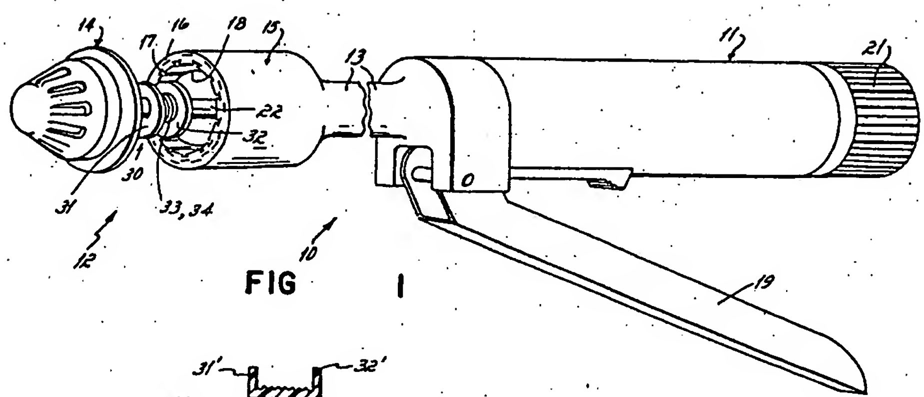

FIG 1

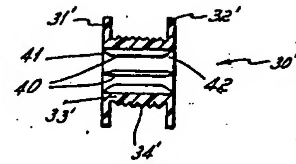

FIG 2

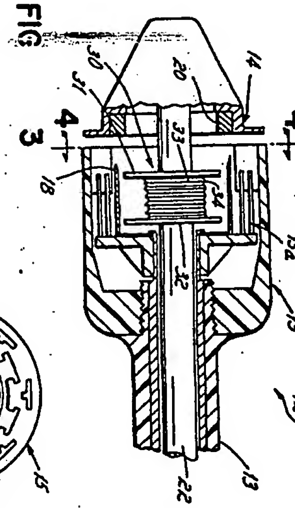

FIG 3

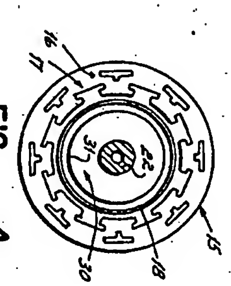

FIG 4

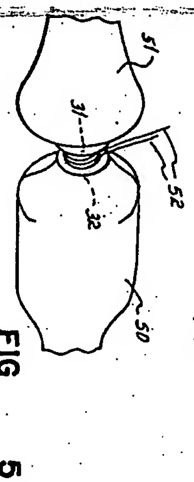

FIG 5

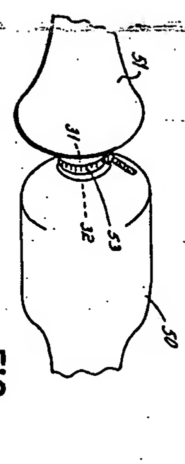

FIG 5A

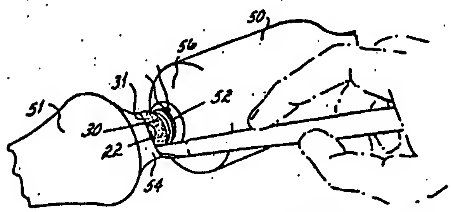

FIG 6

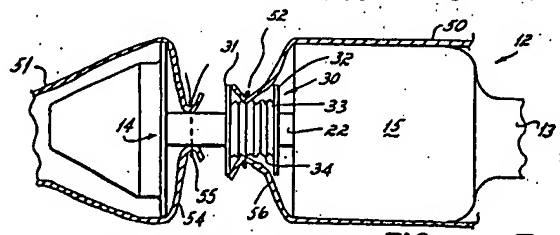

FIG 7

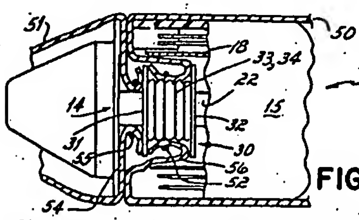

FIG 8

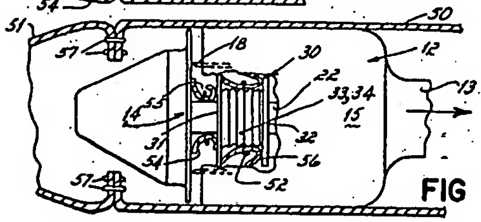

FIG 9

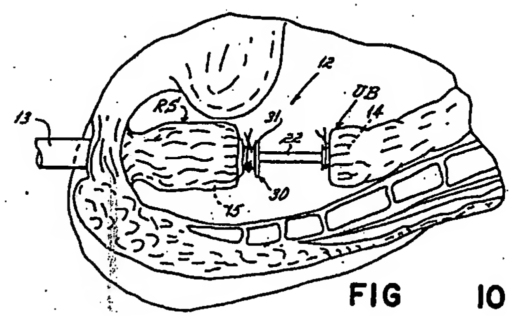

FIG 10

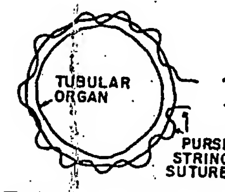

FIG IIA

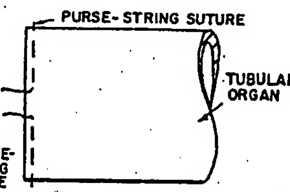

FIG IIB